**Docket No. 16-1015**

*In the*

# United States Court of Appeals

*For the*

# Federal Circuit

IMPULSE TECHNOLOGY LTD,

*Plaintiff - Appellant,*

v.

MICROSOFT CORPORATION, ELECTRONIC ARTS INC. and UBISOFT, INC.,

*Defendants-Appellees,*

THQ, INC.,

*Defendant,*

KONAMI DIGITAL ENTERTAINMENT, INC.,

*Defendant-Appellee.*

*Appeal from the United States District Court for the District of Delaware in Case No. 1:11-cv-00586-RGA-CJB · Judge Richard G. Andrews*

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   None

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# ABBREVIATIONS AND CONVENTIONS

| Abbreviation | Meaning |
|---|---|
| ’121 Patent | U.S. Patent No. 7,359,121 |
| ’496 Patent | U.S. Patent No. 6,876,496 |
| ’565 Patent | U.S. Patent No. 6,308,565 |
| ’726 Patent | U.S. Patent No. 6,765,726 |
| ’808 Patent | U.S. Patent No. 7,791,808 |
| ’997 Patent | U.S. Patent No. 6,430,997 |
| ’997 Dismissal | Stipulated Motion for Dismissal without Prejudice as to all Claims and Counterclaims relating to U.S. Patent No. 6,430,997, ECF No. 421 (Sept. 9, 2015) |
| Appellant or Impulse | Impulse Technology Ltd. |
| Appellees | Appellees Microsoft Corporation, Electronic Arts Inc., Konami Digital Entertainment, Inc., and Ubisoft Inc. |
| Asserted Patents | U.S. Patent No. 6,308,565, U.S. Patent No. 6,430,997, U.S. Patent No. 6,765,726, U.S. Patent No. 6,876,496, U.S. Patent No. 7,359,121, and U.S. Patent No. 7,791,808, collectively |
| BB__ | Impulse’s Principal Brief or Blue Brief |
| Bregler Decl. | Declaration Of Christoph Bregler, Ph.D, In Support Of Defendants’ Motion For Partial Summary Judgment Of Invalidity And Motion For Partial Summary Judgment Of Noninfringement And No Willful Infringement and exhibits thereto (Jan. 17, 2014) |
| Craig Dep. | Transcript of Robert Craig’s Mar. 19, 2013 Deposition, Ex. 11 to the Declaration of Sonal N. Mehta in Support of Defendants’ Motion for Partial Summary Judgment of Invalidity, Motion for Partial Summary Judgment of Noninfringement and No Willful Infringement, ECF No. 336 (Jan. 17, 2014) |
| EA | Appellee Electronic Arts Inc. |
| FOV | “field of view” |
| Impulse CC Br. | Impulse Technology Ltd.’s Opening Claim Construction Brief, ECF No. 153 (Sept. 12, 2012) |

## ABBREVIATIONS AND CONVENTIONS

| Abbreviation | Meaning |
|---|---|
| Impulse Obj. to RRSJ | Impulse Technology Ltd.'s Objections to Magistrate Judge Burke's March 27, 2015 Report and Recommendation Regarding Summary Judgment, ECF No. 412 (Apr. 13, 2015) |
| JCCS | Joint Claim Construction Statement, ECF No. 138 (Sept. 7, 2012) |
| Konami | Appellee Konami Digital Entertainment, Inc. |
| Konami Stip. | Joint Stipulation and Motion for Judgment of Non-Infringement of U.S. Patent No. 7,359,121 as to Konami Digital Entertainment, Inc., ECF No. 321 (Dec. 9, 2013) |
| *Markman* Tr. | Transcript of *Markman* hearing, ECF No. 299 (Nov. 20, 2012) |
| Microsoft | Appellee Microsoft Corporation |
| MSJ | Defendants' Opening Memorandum in Support of their Motion for Partial Summary Judgment of Noninfringement and No Willful Infringement, ECF No. 333 (Jan. 17, 2014) |
| MSJ Opp'n | Impulse Technology Ltd.'s Brief in Opposition to Defendants Motion for Partial Summary Judgment of Noninfringement and No Willful Infringement, ECF No. 361 (Feb. 18, 2014) |
| MSJ Reply | Defendants' Reply Memorandum In Support Of Motion For Partial Summary Judgment Of Noninfringement And No Willful Infringement, ECF No. 386 (Mar. 4, 2014) |
| Order Adopting RRCC | Order adopting Report and Recommendations re Claim Construction, ECF No. 314 (Aug. 19, 2013) |
| Order Adopting RRSJ | Order Adopting Report and Recommendations re Claim Construction, ECF No. 423 (Sept. 22, 2015) |
| RRCC | Report and Recommendations re Claim Construction, ECF No. 300 (May 13, 2013) |
| RRSJ | Report and Recommendations re Summary Judgment Motions, ECF No. 411 (Apr. 9, 2015) |

## ABBREVIATIONS AND CONVENTIONS

| Abbreviation | Meaning |
|---|---|
| Revised Supp. Sacerdoti Report | Revised Supplemental Expert Report Of Dr. Earl Sacerdoti, Ph.D. Regarding Defendants' Infringement Of U.S. Patent Nos. 6,308,565, 6,430,997, 6,765,726, 6,876,496, 7,359,121 and 7,791,808 |
| Sacerdoti Report | Expert Report Of Dr. Earl Sacerdoti, Ph.D. Regarding Defendants' Infringement Of U.S. Patent Nos. 6,308,565, 6,430,997, 6,765,726, 6,876,496, 7,359,121 and 7,791,808 |
| Sacerdoti Tr. | Transcript of Deposition of Earl Sacerdoti (Sept. 16, 2013) |
| SOC | Statement of Case |
| Ubisoft | Appellee Ubisoft, Inc. |

## STATEMENT OF RELATED CASES

No appeal from this civil action was previously before this or any other appellate court.

## PRELIMINARY STATEMENT

The district court correctly concluded that the accused products—the Kinect video game system and certain video games played with the Kinect—do not infringe as a matter of law. The district court's summary judgment of non-infringement turned on a question of claim scope: whether "a tracking system for continuously tracking an overall physical location of a player ***in a defined physical space***" requires a ***defined*** place in the ***physical*** world where a person can move and be tracked (as the district court found), or can simply be a construct of computer software that does not occupy physical space (Impulse's position).[1] That question of claim scope was conclusive for the district court, as it is on appeal. BB21-22.

The record confirms that the district court correctly decided this key issue in a comprehensive and well-reasoned claim construction opinion. The record also confirms that the district court properly applied that same construction at summary judgment, finding that the claim scope that Impulse sought to apply to keep its infringement claims alive simply could not be reconciled with the claim constructions the court had adopted. A15-A18 [RRSJ]. The district court made no error, and nothing in the record raises any legal or genuine factual question to suggest there is one. Impulse's attempt to argue otherwise amounts to little more

---

1 Emphasis added and citations omitted throughout, unless otherwise noted.

than a last-ditch attempt to stretch its right to exclude far beyond what it claimed or described as its invention.

## JURISDICTIONAL STATEMENT

On September 12, 2015, the district court entered final judgment of non-infringement. A2569 [Judgment]. The district court had jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a). This Court has jurisdiction under 28 U.S.C. § 1295(a)(1).

## STATEMENT OF ISSUES PRESENTED FOR REVIEW

1) Is the district court's construction of the patent-specific term "defined physical space" to give meaning to both requirements of definition and physicality correct in view of the overall record?

2) Did the district court correctly apply its claim construction of "defined physical space" to undisputed facts as to the operation of the accused device in granting summary judgment of non-infringement?

## STATEMENT OF THE CASE

## I. THE PARTIES

### A. Impulse

Impulse is one of several related companies run by Barry J. French, who is also named inventor of the asserted patents. Over the last decade, Mr. French has attempted to commercialize exercise equipment incorporating a well-known and basic form of motion tracking that requires the user to wear a "marker" or "beacon" for the system to detect the player's location. His goal was to develop equipment for a submarket of the exercise equipment field, and to partner with other entities to develop mass-market motion sensing exercise equipment. Those efforts have been largely unsuccessful, and Mr. French's companies remain small players in a niche market of equipment for high-priced fitness facilities and physical rehabilitation centers. More recently, Impulse has concentrated on monetizing its patents through litigation.

### B. Appellees

Microsoft is a worldwide leader in software, consumer electronics, and interactive entertainment. Its accused Xbox 360 platform has been one of the top-selling video game systems in the United States, serving as a major gaming console (for Microsoft games and numerous third-party games), social gaming platform (through Xbox Live), and home entertainment console. In late 2010, Microsoft introduced the revolutionary Kinect motion sensing input device, which allows users to interact with the Xbox 360 through a natural user interface using gestures and spoken commands.

The remaining Appellees—EA, Konami, and Ubisoft—are leading developers or publishers of video games, including games compatible with Microsoft's Xbox 360 console and Kinect interface.

## II. THE ASSERTED PATENTS

Impulse accuses Microsoft, EA, and Ubisoft of infringing six patents: the '565 Patent, the '997 Patent, the '726 Patent, the '496 Patent, the '121 Patent, and the '808 Patent. A9 [RRSJ].[2] The patents are related and share a common specification. *Id.* For simplicity, Appellees refer to the specification of the '565 Patent when discussing the asserted patents.

The asserted patents do not purport to invent motion tracking. A2592 [Impulse CC Br.] (the tracking system uses "virtually any type of known technology"). They do not purport to invent virtual reality. *Id*. ("At the time of the filing of the '565 patent, Impulse acknowledged the existence [of] numerous 'virtual reality or quasi virtual reality systems used for entertainment purposes []

[2] After a number of rounds of claim narrowing, the remaining asserted claims are Claims 1, 5, 9, 30, 36 and 57 of the '565 Patent, Claim 11 of the '997 Patent, Claim 16 of the '726 Patent, Claims 1, 3 and 5 of the '496 Patent, Claim 22 of the '121 Patent, and Claims 12, 15 and 17 of the '808 Patent. BB8 (citing A14). The '997 Patent is not asserted against Microsoft.

Before judgment, Impulse's claims against Konami were narrowed to only Claim 22 of the '121 Patent. A3155 [Konami Stip.] at n.1.

for measuring physical exertion.'"). And certainly they do not claim to invent video game systems. A151 ['565 Patent] at 11:63-12:3 (discussing "conventional video games"). Rather, the claimed system is, at its core, a specific system for a specific use—the use of known motion tracking, virtual reality, and simulation technologies for accurate simulation of sports training. That is all that is claimed and that is all that is disclosed in the patents.

The asserted patents describe a virtual-reality training system that provides an "[a]ccurate simulation of sport to quantify and train performance constructs." A118 ['565 Patent] at Abstract. The common specification characterizes "[t]he present invention [a]s a system for quantifying physical motion of a player or subject and providing feedback to facilitate training and athletic performance." A147 ['565 Patent] at 4:30-33. Prior to the asserted patents' critical date, "various types of virtual reality or quasi virtual reality systems used for entertainment purposes of []or measuring physical exertion" already existed. *Id.* at 4:8-11. But the applicant distinguished the claimed virtual-reality training system from "[t]hese prior art systems," which allegedly "provide[d] no measurement or inadequate measurement of physical activity." *Id.* at 4:25-28. Thus, the bulk of the patent specification is devoted to the measurement of physical movement and training based on such measurement.

For purposes of this appeal, Claim 1 of the ’565 Patent is generally representative of the asserted patent claims against Microsoft, EA, and Ubisoft. BB8. Claim 1 reads:

> 1. A testing and training system comprising:
>
> a tracking system for continuously tracking an overall physical location of a player in a defined physical space; and
>
> a computer operatively coupled to the tracking system for updating in real time a player virtual location in a virtual space corresponding to the physical location of the player in the physical space, for updating a view of the virtual space, and for providing at least one indicium of performance of the player moving in the physical space, wherein the at least one indicium is or is derived from a measure of a movement parameter of the player.

A165 [’565 Patent] at Claim 1.

The claimed system includes tracking a player as the player moves around a “defined physical space,” such as an indoor tennis court or an outdoor football field. A146 [’565 Patent] at 1:18-26; A149 [’565 Patent] at 8:26-30; A150 [’565 Patent] at 9:8-24. To track the player, the asserted patents describe placing a beacon or reflector on the player’s body. A148 [’565 Patent] at 5:19-22; *see also* A150 [’565 Patent] at 9:40-42. This single beacon or reflector represents the “overall physical location” of the player. A148 [’565 Patent] at 5:19-22. A computer then depicts a “representation” of the player on a monitor in “virtual space” by looking at the coordinates of the player in physical space and scaling those coordinates to virtual space, which itself is a spatially-accurate representation of physical space. A163 ['565 Patent] at 32:6-13. The claimed system thus "assesses and quantifies agility and movement skills by continuously tracking the player in the 65 defined physical space 12 through continuous measurement of Cartesian coordinate positions." A149 ['565 Patent] at 8:63-66.

Below is a figure of a defined physical space and a display showing a representation of the computer-generated virtual space:

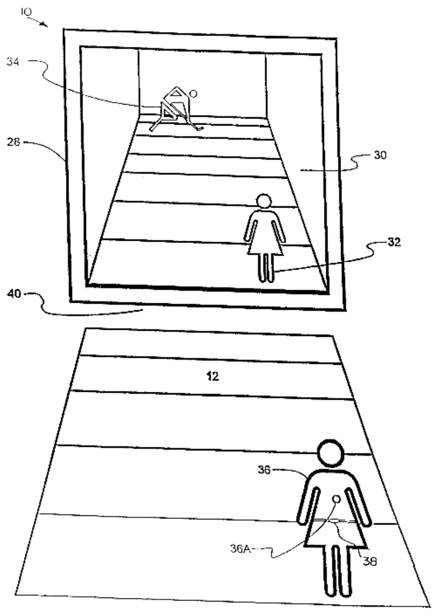


FIG. 2

A121 ['565 Patent] at Fig. 2.

The defined physical space is the rectangular court 12 at the bottom of the figure. A149 ['565 Patent] at 8:43-45. A player 36 is depicted in the defined physical space and is shown wearing a beacon or reflector 38 and a heart rate monitor 36A. *Id.* at 8:63-66; *see also* A150 ['565 Patent] at 9:40-43. A corresponding virtual space 30 is depicted on a monitor above the defined physical space. A149 ['565 Patent] at 8:43-45. As the player moves from one location to another in the defined physical space, the overall physical location of the player is tracked using the beacon or reflector 38, and that movement is reflected by player icon 32 in the virtual space 30. *Id.*; *see also* A150 ['565 Patent] at 9:47-50.

Importantly, the specification teaches: "[t]he defined physical space 12 may be any available area, indoors or outdoors of sufficient size to allow the player to undertake the movements for assessing and quantifying distance and time measurements relevant to the player's conditioning, sport and ability." A150 ['565 Patent] at 9:8-12. "A typical physical space 12 may be an indoor facility such as a basketball or handball court where about a 20 foot by 20 foot area with about a 10 foot ceiling clearance can be dedicated for the training and testing. It will be appreciated that the system 10 may be adaptable to physical spaces of various sizes." *Id.* at 9:12-17. The patent thus depicts and describes the "defined physical space" as an area that has boundaries and occupies space in the real world where physical movement happens.

The virtual space 30 is a scaled representation of the defined physical space. A149-A150 ['565 Patent] at 8:43-9:51. As the player 36 reaches a real physical boundary, the player icon 32 likewise reaches a boundary in the virtual space. A149-A150 ['565 Patent] at 8:63-9:7. This scaled correspondence between the physical space and the virtual space maintains the fidelity of virtual-reality training simulation. It is not difficult to imagine why a realistic sports training simulator requires scaled correspondence between the physical space and the virtual space. It would not make any sense for a player to run outside the physical boundaries (e.g., a tennis court), yet remain inside the virtual boundaries (e.g., the virtual tennis court corresponding to the physical tennis court), or for the player to remain stationary while the virtual player moves in virtual space. Spatial correspondence runs throughout the claim limitations. For example, the claims require a "defined physical space" and "updating in real time a player virtual location in a virtual space corresponding to the physical location of the player in the physical space." A164-A165 ['565 Patent] at Claim 1.

The virtual-reality simulator engages the user in sport-specific training drills and measures the user's ability to move in the physical space, such as "first step quickness" or "cutting ability." Indeed, half of the thirty columns comprising the Detailed Description of the Invention are dedicated to various techniques of quantifying the user's performance as the user moves from one location to another in the defined physical space. A153-A161 ['565 Patent] at 15:16-31:29.

As discussed herein, the accused systems function in fundamentally different ways. Thus, to cover the accused video games, Impulse's litigation positions seek to stretch the scope of its claims far beyond what the claims support.

## III. THE ACCUSED PRODUCTS

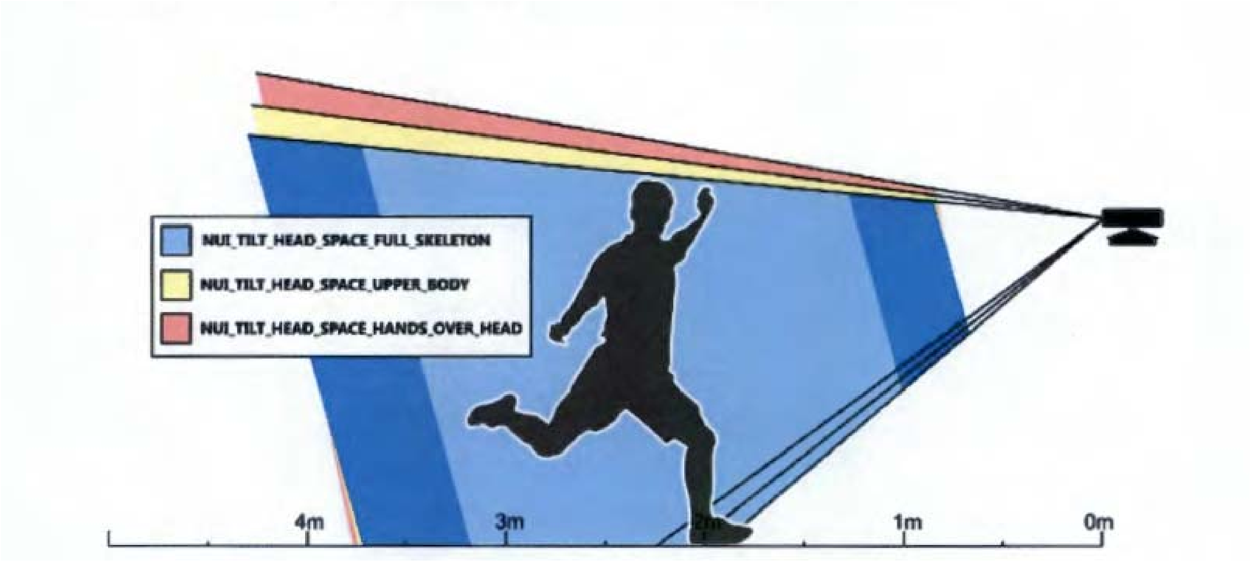
The accused products are the Microsoft Xbox 360 video game console when used with the Kinect sensor, and video games for that system. Microsoft makes the system—i.e., the Xbox 360 video game console with Kinect sensor—and a number of games that employ the system's innovative ability to translate a user's natural movement into gameplay. The other Appellees also develop or publish games for use with the Kinect.

Launched in 2010 after years of research and development by dozens of scientists and engineers at Microsoft and Microsoft Research, the Kinect sensor revolutionized the video game industry by making handheld game controllers unnecessary, instead letting users control the system directly through their own physical gestures or audible speech. *See* A2747 [MSJ]; A9-A10 [RRSJ]. For example, one accused mini-game is River Rush, wherein players control a raft—shown on screen—by moving their own bodies, stepping left or right to steer the raft and jumping up to make the raft do the same. A11 [RRSJ].

What makes that sort of hands-free game control possible is the Kinect's proprietary sensor hardware and software algorithms. Those algorithms direct the system to track 20 specific points in the viewing range of the Kinect sensor that correspond to 20 specific joints on a user's body. *See* A2747 [MSJ]; A1137-A1140, A1404-A1409 [Bregler Decl.]; A10-A11 [RRSJ]. The Kinect system outputs the location of those 20 points using a coordinate system centered at the Kinect sensor. A10, A15 [RRSJ]. Importantly, because the Kinect system is agnostic to the physical space of its user, people can play the same game in living rooms of wildly different sizes (or even outdoors). A1416 [Bregler Decl.].

This aspect of the Kinect system was a crucial early design choice. According to Robert Craig, then head of the Kinect Skeletal Tracking team for Microsoft, "[t]he first task [in developing the Kinect] was understanding the sensor and understanding how could we make something like this work at an affordable price point that would work in all kinds of different living rooms where we took it in [the] world, and provide a skeleton that was an approximation that could be used for games for entertainment purposes." A2721 [Craig Dep.] at 25:3-7. The challenge of building a video game system that could work anywhere led to the development of a system defined around the Kinect sensor. As Mr. Craig explained, "[t]hat's kind of the beauty of the Kinect sensor; it could be anywhere." A2726 [Craig Dep.] at 82:19-20.

To achieve this, the Kinect includes an infrared sensor that can track motion within a cone-shaped area in front of it. A10 [RRSJ]. Once the sensor is turned on, the infrared cone extends from the camera in the front of the Kinect sensor outward to create a vertical field of view of about 57 degrees, a horizontal field of view of horizontally of about 43 degrees, and a practical viewing depth of approximately 0.8 to 4.0 meters. *Id.* The figure below depicts the cone-shaped viewing area extending from the Kinect sensor on the right:


NUI_TILT_HEAD_SPACE_FULL_SKELETON
NUI_TILT_HEAD_SPACE_UPPER_BODY
NUI_TILT_HEAD_SPACE_HANDS_OVER_HEAD
4m
3m
2m
1m
0m

A10 [RRSJ]; A2430 [XDK Document]; A2798 [MSJ Opp'n]. The Kinect sensor images the area it can see 30 times each second to determine the locations of the 20 points described above. A306-A307 [Sacerdoti Report]; A1456-A1457 [Bregler Decl.]. Because the field of view is completely dependent on the sensor position and orientation, it changes depending on the space in which it is set up, where it is set up, and its angle.

The Xbox 360 console displays the game's virtual environment, typically on a television screen. The environment of the game—determined by the particular game being played and user's game play—is agnostic to the physical space surrounding the Kinect and its user. A1416 [Bregler Decl.]. Thus, in the River Rush example, the virtual environment would be a raft moving down a river or over rapids. A2733-A2734. In other games, the virtual environment might be a car driving on a varying race track, or an underwater vessel or chamber. A2730-A2731.

# IV. RELEVANT PROCEDURAL HISTORY

## A. Claim Construction

The district court's claim construction proceedings were robust. After the exchange of infringement and invalidity contentions and claim construction disclosures, the parties fully briefed and argued a number of claim construction disputes to Magistrate Judge Christopher J. Burke. Judge Burke issued a thorough and well-reasoned 64-page Report and Recommendation. A54-A117 [RRCC]. The district court's final claim construction order adopted the conclusions in the Report and Recommendation, without any objection from Impulse. A51-A53 [Order Adopting RRCC].[3]

On appeal, Impulse challenges only one of the district court's rulings: the construction of "defined physical space." During claim construction, Impulse argued that the term "defined physical space" should be construed as "any available area, indoors or outdoors of sufficient size to allow player movements."

[3] Impulse did not object to the Report and Recommendation on claim construction. Appellees objected as to claim limitations that are not at issue in this appeal. Those objections were addressed in the final claim construction order, which clarified the constructions in line with Appellees' objections. A51-A53 [Order Adopting RRCC].

A68 [RRCC]. Appellees' proposed construction was an "indoor or outdoor space having known size and boundaries." *Id.* The parties' briefing raised two disputes: (1) whether the boundaries of the physical space had to be known, and (2) whether the defined physical space was a real-world physical space that existed independently of the sensor's tracking area, or could be co-extensive with or a subset of the tracking area of the tracking system's sensor. A69 [RRCC].

On the first point, the parties agreed during the claim construction hearing that the defined physical space could have infinite boundaries in some dimensions. A69 [RRCC]. As both sides acknowledged, that construction was consistent with the examples in the patents—i.e., a football or baseball field of predetermined length and width, but open to the sky, and therefore vertically infinite. *See id.* The district court's construction therefore required *inter alia* an "indoor or outdoor space having size and/or boundaries," and did not exclude spaces with some boundaries that were not defined—and therefore extended infinitely in at least some directions. *Id.*

The district court's resolution of that dispute, however, did not answer the other, more fundamental question of claim scope presented by the parties: whether the "defined physical space" can be defined by the sensor rather than being a defined space in the physical world in which a player moves and is tracked. *See*

A69 [RRCC]. The parties raised that issue explicitly in their claim construction briefing, and the court addressed it head-on during the claim construction hearing:

> THE COURT: Again, it comes down to whether it's sensor defined: right? I mean, at least can the physical space be sensor defined? . . .
>
> [Impulse Counsel]: That's right.
>
> THE COURT: And the point is whatever ultimate definition comes out of this, can it capture that concept or does it not capture that concept?
>
> [Impulse Counsel]: And that's an issue for infringement. The question is whether that is defined.
>
> [Appellees' Counsel]: I think that's an issue that's presented to the Court.

A2652 [*Markman* Tr.] at 122:18-123:12.

At that time, Impulse argued the issue was not one of claim construction, but "an issue for infringement." A69 [RRCC]. But the district court correctly recognized that "there is clearly a dispute as to what the scope of the claim term 'defined physical space' (and the related terms) covers, which requires the Court's attention." A72 [RRCC] (citing *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351 (Fed. Cir. 2008)).

Importantly, Impulse did not suggest that the term's plain and ordinary meaning settled the question. Nor could it. Impulse never asserted that the term "defined physical space" should be given a plain and ordinary meaning or had any meaning at all outside the patent. In the parties' joint claim construction statement, Impulse's proposed construction was "any available area, indoors or outdoors of sufficient size to allow player movements." A2574-A2575 [JCCS]. In support, Impulse cited only the specification. *Id.* Neither side presented extrinsic evidence. *Id.*

The district court consulted the intrinsic evidence to resolve the parties' dispute. First, it looked to the claim as a whole, which required "the 'defined physical space' [to be] the space in which the player's movements are tracked[,]" but otherwise offered "little guidance as to what it is that makes up a 'defined physical space[.]'" A70 [RRCC]. Then it turned to the specification for guidance, including the portions Impulse and Appellees cited. A70-A72 [RRCC]. The district court held that the defined physical space was "(1) an independent concept from the sensor viewing area and (2) a space that is known prior to the adaption of the testing and training system to that space." A72 [RRCC]. The court reasoned: "[t]he Court can find no indication in the patents that the sensor viewing area generated by that system can constitute a 'defined physical space.' Indeed, for its part, Plaintiff does not point the Court to any portions of the specification that support such a conclusion; . . . ." *Id.* Thus, the court construed "defined physical space" to require "an indoor or outdoor space having size and/or boundaries known prior to the adaptation of the testing and training system." *Id.*

Impulse did not object to this construction and it was adopted in the district court's final claim construction order. A51-A53 [Order Adopting RRCC].

### B. Stipulated Judgment of Non-Infringement as to Konami

Following claim construction, Impulse and Konami stipulated to judgment of non-infringement on the sole remaining patent claim asserted against Konami (Claim 22 of the ’121 Patent). A3157 [Konami Stip.]. To avoid piecemeal appeals, the parties stipulated and the district court ordered that judgment in Konami’s favor would be entered at the conclusion of district court proceedings. *Id.*; A2569 [Judgment]. The stipulation identified the constructions of “positioning the representation of the user” and “moving the representation of the user to reflect movement of the user” as limitations on which Impulse conceded non-infringement. A3156 [Konami Stip.]. That stipulation notwithstanding, Impulse has not raised on appeal any argument concerning the ’121 Patent that could call into question the judgment entered in Konami’s favor.

### C. Summary Judgment Of Non-Infringement as to Microsoft, EA, and Ubisoft

Following the district court’s final claim construction order and extensive expert discovery, Microsoft, EA, and Ubisoft filed motions for summary judgment of invalidity and non-infringement. Only the district court’s ruling on the non-infringement motion is at issue in this appeal.

Because of the fundamental differences between the claimed system and the accused products, Appellees moved for judgment that the accused products did not satisfy multiple different claim limitations: (1) “defined physical space,” (2) "virtual space," (3) operation in "real time," (4) "translation relative to a display," (5) for Ubisoft, "updating in real time a player virtual location" or "positioning the representation of a user on the monitor," and (6) for Ubisoft, a "training sequence." A2749-A2779 [MSJ].

After extended briefing and a full hearing, Magistrate Judge Burke granted Appellees' motion on the first ground—that the accused systems did not include a "defined physical space." A15-A18 [RRSJ]. In a lengthy Report and Recommendation, Judge Burke rejected Impulse's argument that a set of "hardcoded values . . . that are burned onto each game disc at the time it is manufactured" satisfied the "defined physical space" limitation. A15 [RRSJ]. In so ruling, the court found that allegation legally insufficient for three reasons. First, it explained that the hardcoded values accused by Impulse are "just numbers . . . contained in the source code for the Accused Games'" and therefore "not an actual *physical space* at all—that is, it is not a physical area with dimensions that can be measured such that the claimed system can be adapted to it.'" A15 [RRSJ] (original ellipses and emphasis). Second, the court recognized that, even if the hardcoded values define an area, it is not a ***physical*** space at all. At most, what the hardcoded values define is a "purely abstract" space that "exists only as a mathematical construct in relation to the location and direction of the sensor." A17 [RRSJ]. But even if those values define space in some space, that space "cannot be characterized as any particular physical space that exists indoors or outdoors" as "required by the claims and the Court's construction." *Id.* Finally, the district court explained that even "to the extent that those values can be said to represent an actual, physical space, that space cannot be 'known and defined *prior* to the adaptation of the system to particular space' as required by the Court's claim construction." *Id.* (original emphasis).

The court emphasized that the third conclusion followed from its decision during claim construction, which "made clear that the space *itself* must be known prior to the adaptation of the system *to that (now, already known) space*." A18 [RRSJ] (original emphasis). As the court put it, "[t]hat conclusion was at least implicit in the actual phrasing of the Court's construction of 'defined physical space.' But it was certainly explicit in the Court's reasoning leading up to its adoption of the construction." *Id.* It therefore held that "Plaintiff cannot now ignore that requirement and accuse a set of products implicating an alleged physical space that is entirely unknown prior to the adaptation of the system at issue." *Id.*

In granting summary judgment, the court also considered—and rejected—Impulse's doctrine of equivalents theory.[4] A18-A22 [RRSJ]. As the court

[4] In their summary judgment motion, Appellees challenged Impulse's doctrine of equivalents theory as untimely. A2757-A2758 [MSJ]. Impulse failed to put

explained, Impulse "provides only the skeletal framework of its doctrine of equivalents argument—an argument set out in merely a single short paragraph of its answering brief." A18 [RRSJ]. The court explained that the doctrine of equivalents theory was grounded solely on Impulse's infringement expert's conclusion that a "'defined physical space that is defined in reference to a sensor position (such as the spaces I have identified in the Accused Video Games) performs the same function, in a substantially similar way, to achieve the same result as a physical space that is defined without relation to the sensor position.'" A19 [RRSJ].

Thus, the court found that Impulse had not come forward with evidence sufficient to preclude summary judgment of non-infringement:

> But the question is not whether a coordinate system defined in relation to the sensor is equivalent to a coordinate system defined with reference to some other point. . . . And so, the relevant comparison for purposes of invoking the doctrine of equivalents is whether a coordinate system defined relative to the sensor is equivalent to the real-world physical space required by the claims. ***Plaintiff has offered no argument or expert testimony comparing an abstract set of coordinates to this real-world physical space. Summary judgment is warranted on that basis alone.***

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defendants on notice of that theory until the eleventh hour—disclosing the theory for the first time in a supplemental expert report, almost two months after serving its burden of proof expert report. *Id.* The district court noted Appellees had not filed a separate motion to strike the report, but denied the request as moot given its conclusion that there could be no infringement under the doctrine of equivalents. A19 [RRSJ].

A19-A20 [RRSJ].

Beyond this failure of proof, the district court also rejected the underlying premise of Impulse's doctrine of equivalents theory because it would vitiate the very requirement of a "defined physical space." A20-A22 [RRSJ]. Specifically, the court found:

> Here, no reasonable jury could find that an abstract space is "interchangeable" with an actual, physical space, or that the differences between the two are "insubstantial." The relative, abstract space accused by Plaintiff performs a substantially different function than a defined physical space. ***The function of the defined physical space in the claim is to provide a known area for the player to move, such that the player's movements may be tracked by a tracking system***. ('565 patent, col. 5:19-26; D.I. 300 at 17-19). Such a tracking system may be adapted to the defined physical space; in other words, the defined physical space of the claims is known before adaption of the sensor. ('565 patent, col. 9:8-34; D.I. 300 at 18-19). ***The abstract, hardcoded coordinates accused by Plaintiff cannot serve this function*** because they do not represent any real-world physical space.

A21 [RRSJ].

Because the determination of no "defined physical space" was independently case-dispositive on fourteen of fifteen asserted claims, the court found it unnecessary to resolve the remaining independent grounds for non-infringement. A22 [RRSJ].

Impulse objected to the Report and Recommendation on Summary Judgment on the same two grounds it argues on appeal: (1) that the summary judgment ruling was based on a new and improper claim construction; and (2) that, even under that claim construction, there would still be infringement under the doctrine of equivalents. A3-A5 [Order Adopting RRSJ].

District Judge Richard G. Andrews resolved Impulse's objections in the court's final summary judgment order. On the first point, the court rejected Impulse's objection, noting that while "[t]he claims are indifferent as to whether the space is indoors or outdoors," "[t]hey do, however, require that the space exist in the physical world (either indoors or outdoors) as opposed to the non-physical (or 'abstract,' as the Magistrate Judge called it) world." A4 [Order Adopting RRSJ]. "The last argument, that the boundaries cannot be defined relative to the sensor, is the argument the Magistrate Judge rejected during claim construction." *Id.* On the second point, the court found that "[t]he difference between the claims' defined physical space (known 'prior' to set up of the system) and the accused product's hardcoded values (meaning the physical space is only known 'after' the set up of the system) is too great to be covered by the doctrine of equivalents." A6-A7 [Order Adopting RRSJ]. To wit, "[t]he accused product operates in essentially the opposite fashion of that described in the claims." A7 [Order Adopting RRSJ].

Judgment was entered for Appellees.[5] A2569 [Judgment].

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[5] The district court's summary judgment ruling resolved fourteen of fifteen asserted claims across five of six asserted patents. Pursuant to stipulation,

## SUMMARY OF THE ARGUMENT

This appeal turns on a single question of claim scope: whether the claimed "defined physical space" is a defined space in the real, physical world in which the player moves and is tracked, or can be construed so broadly as to include a non-physical construct that is simply derivative of—and does not exist independent of—the tracking system that is supposed to track user movement in that defined physical space. The district court correctly resolved that issue at claim construction, and correctly granted summary judgment of non-infringement based on that construction. Impulse's contrary position has not only been waived, but finds no support in the record of this case or the precedent of this Court.

Impulse's primary argument against the district court's claim construction involves the court's use of the specification as guidance in the process. But the district court did exactly what *Phillips* and its progeny require: it used the specification as a tool—after first consulting to the claim language—to help resolve a ripe dispute about claim scope. Indeed, Impulse itself encouraged the district court to look to the specification as support for Impulse's proposed construction of "defined physical space." Impulse did not argue that the claim language was plain on its face or cite to any other evidence (intrinsic or extrinsic)

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Impulse's claims with respect to the sixth asserted patent were dismissed without prejudice. A2888 ['997 Dismissal].

as probative as to the scope of the claim. Under these circumstances, the district court could not have erred in consulting the specification as a source—beyond the claim language itself—in resolving the claim scope dispute.

On the merits, the district court was correct to construe "defined physical space" as an "indoor or outdoor space having size and/or boundaries known prior to the adaptation of the testing and training system." That construction reflected its conclusion that the claims and specification required that the "defined ***physical*** space" must exist in the real, physical world, no matter the state of the tracking system. As explained in detail by the district court and confirmed by the evidence identified herein, that construction is the only one that stays true to claims and the specification.

In contrast, Impulse's position as to claim scope seeks to eliminate the claim's express requirement that the space be both ***defined*** and ***physical***. In so doing, it also seeks to eliminate the patents' fundamental distinction between the "defined physical space" in which the player moves and is tracked, and the independent concept of a sensor viewing area. The district court gave meaning to that distinction by requiring the "defined physical space" to be an actual indoor or outdoor area in the real world, which space is defined and identified independent of the sensor (i.e., it is known and defined before the sensor is set up and does not depend on the location, direction, or set up of the sensor). Impulse attempts to eliminate that distinction by conflating "defined physical space" with any space that has some purported definition, whether that space is physical or not, and whether that definition relates to the physical space or not. This is neither claimed nor described, let alone enabled. The claims require that the requirements of definition and physicality be read together, and the patents explain what that means in the context of this invention. The district court's construction gives those requirements their appropriate meaning.

Importantly, Impulse's argument against summary judgment hinges on the same question of claim scope. Other than claim construction arguments, Impulse offers little to support its appeal of the summary judgment ruling. Nothing in Impulse's brief or the record even hints at a factual question that could save its case. That is because there is no relevant dispute as to how the accused system works. The only dispute is whether the accused element of the Kinect system—source code values that do not occupy any defined physical space in which a person could move and have no direct relationship or correlation to any such space—can nevertheless constitute a "defined physical space." They cannot. For proof, this Court need not look beyond the admissions of Impulse's own infringement expert, which confirm beyond doubt that, if the district court was correct on claim construction, there is simply no literal infringement.

For the same reasons, the doctrine of equivalents does not help Impulse. In support of its belated doctrine of equivalents theory, Impulse relied only upon conclusory expert testimony that the district court correctly rejected under this Court's precedents. Impulse simply failed to present the particularized argument and linking testimony this Court requires. Impulse even failed to have its expert address the relevant issue—specifically, whether the difference between a defined physical space and software containing numerical values is insubstantial. The district court correctly found that the answer to that question—the relevant question for a doctrine of equivalents analysis—must be no. Any other answer would allow Impulse to vitiate the requirement of a "defined physical space" altogether.

The judgment should be affirmed.

## ARGUMENT

### I. IMPULSE'S APPEAL TURNS ON A DISPUTE ABOUT CLAIM SCOPE THAT THE DISTRICT COURT CORRECTLY DECIDED DURING CLAIM CONSTRUCTION

#### A. Impulse's Waived Its Appeal Because It Never Objected To The Claim Construction Report and Recommendation

As a threshold matter, Impulse waived any substantive objection to the claim construction of "defined physical space" because it never objected to the Report and Recommendation that contains the claim construction now on appeal. *See* SOC.IV.A *supra*. Impulse's waiver follows from *Thomas v. Arn*, 474 U.S. 140, 148 (1985), where the Supreme Court held that circuit courts could establish a rule that a party's failure to object to a magistrate's report would give rise to waiver. Such a rule "prevents a litigant from 'sandbagging' the district judge by failing to object and then appealing[,]" while "forc[ing] the court of appeals to consider claims that were never reviewed by the district court, . . . ." *Id.* In other words, the same rationale justifying waiver of arguments not raised to the district court justifies waiver of arguments not raised to the district court in objections to a magistrate's recommendations under 28 U.S.C. § 636(b)(1). *See Thomas*, 474 U.S. at 147-48.

Pursuant to Federal Rule of Civil Procedure 72(a), "[w]hen a pretrial matter not dispositive of a party's claim or defense is referred to a magistrate judge to hear and decide," a party "may not assign as error a defect in the order not timely objected to" within the fourteen days permitted under the Rule. Thus, in the Third Circuit, whether the failure to object constitutes waiver depends on whether the referred matter is dispositive under 28 U.S.C. § 636(b)(1)(B) or non-dispositive under 28 U.S.C. § 636(b)(1)(A). *See United Steelworkers of Am., AFL-CIO v. New Jersey Zinc Co.*, 828 F.2d 1001, 1005-06 (3d Cir. 1987) ("We have treated nondispositive matters referred to a magistrate under subparagraph (A) differently, and have expressly stated that a party's failure to object to a magistrate's ruling waives the party's objection.").

While the Report and Recommendation at issue here states that it is issued pursuant to 28 U.S.C. § 636(b)(1)(B), Appellees have not found any decision from this Court determining that a magistrate judge's pretrial ruling on matters of claim construction is dispositive under that subsection such that failure to object to it is not a waiver. To be sure, claim construction can determine claim scope in a manner that will ultimately give rise to a dispositive judgment of infringement or non-infringement, but it is not a ruling that itself disposes of any claim or defense in the case. *See, e.g.*, *ADE Corp. v. KLA-Tencor Corp.*, 252 F. Supp. 2d 40, 55 n.18 (D. Del. 2003) ("Since patent claim construction is a question of law under *Markman*, ***even though not case dispositive***, the magistrate judge's opinion is subject to plenary review."); *see also McKesson Info. Sols., Inc. v. Bridge Med., Inc.*, No. CIV. S-02-2669 FCD KJM, 2005 WL 6293757, at *2 n.4 (E.D. Cal. June

7, 2005) (noting that "[t]he court is unaware of any circuit court authority determining whether claim construction is a dispositive or nondispositive matter under Fed.R.Civ.P. 72[,]" and finding persuasive the determination in *Tom Hayden Enterprises, Inc. v. Southern Oregon Hot Bikes, Inc.*, Civ. No. 03-3034-CO, 2004 WL 1686937 (D. Or. July 27, 2004) (finding that claim construction is a non-dispositive pretrial matter))[6]; *Calypso Wireless, Inc. v. T-Mobile USA Inc.*, No. 2:08-CV-441-JRG-RSP, 2013 WL 684741, at *2 (E.D. Tex. Feb 25, 2013), *aff'd*, 586 F. App'x 707 (Fed. Cir. 2014) (noting claim construction is non-dispositive); *but see Von Holdt v. A-1 Tool Corp.*, 636 F. Supp. 2d 726, 729-30 (N.D. Ill. 2009) (reviewing claim construction *de novo* and noting it was likely dispositive of infringement claims); *Fisher-Price, Inc. v. Kids II, Inc.*, No. 1:10-CV-00988 EAW, 2015 WL 2401887, *1 (W.D.N.Y. May 19, 2015) (same).

Although Impulse's challenge to the district court's claim construction should be rejected on this basis alone, Appellees nevertheless address the merits of Impulse's arguments on appeal, which confirm the correctness of that construction.

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6 *McKesson* noted district court authority that claim construction is a dispositive matter. However, the opinion cited, *ADE Corp. V. KLA–Tencor Corp.*, 288 F. Supp. 2d 590 (D. Del. 2003), addresses whether claim construction is subject to plenary review, not whether it is dispositive. *Id.* at 592-93. And, as noted above, the district court in that case previously determined that claim construction was subject to plenary review because it was a matter of law, not because it was dispositive.

### B. The District Court Correctly Consulted The Specification As One Tool In Resolving A Claim Construction Dispute

Impulse's primary substantive objection relates to the district court's use of the specification as guidance in the claim construction process. BB25. But courts are supposed to consult the specification to aid in claim construction. As this Court has repeatedly held, "claims ***must*** be read in view of the specification, of which they are a part.'" *Trs. of Columbia Univ. v. Symantec Corp.*, 811 F.3d 1359, 1362 (Fed. Cir. 2016) (quoting *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005) (en banc)); *see also id.* at 1363 ("*Phillips* makes clear that '[t]he claims . . . do not stand alone. Rather, they are part of a fully integrated written instrument, consisting principally of a specification that concludes with claims.'"). For that reason, "'claim terms are construed in light of the specification and prosecution history, not in isolation.'" *UltimatePointer, L.L.C. v. Nintendo Co.*, No. 2015-1297, 2016 WL 798352, at *5 (Fed. Cir. Mar. 1, 2016) (quoting *Pacing Techs., LLC v. Garmin Int'l, Inc.*, 778 F.3d 1021, 1024 (Fed. Cir. 2015)). Consistent with this, "'the specification may define claim terms by implication such that the meaning may be found in or ascertained by a reading of the patent documents.'" *Symantec*, 811 F.3d at 1364 (quoting *Phillips*, 415 F.3d at 1320-21).

This Court recently affirmed a district court's refusal to divorce claim language from the specification because, "'[i]mportantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.'" *UltimatePointer*, 2016 WL 798354, at *4 (quoting *Phillips*, 415 F.3d at 1313). On the flip side, it has reversed a district court for adopting a broad construction divorced from the specification. *See EON Corp. IP Holdings LLC v. Silver Spring Networks Inc.*, No. 2015-1237, 2016 WL 766661, at *6 (Fed. Cir. Feb. 29, 2016) (rejecting construction "completely untethered to the context of the invention in this case," and explaining that, although terms "might theoretically, in the abstract, be given such a broad meaning, they cannot be construed that way in the context of the [asserted] patents").

Under this Court's precedents, the specification must be consulted because "[t]he only meaning that matters in claim construction is the meaning in the context of the patent.'" *Symantec*, 811 F.3d at 1363; *see also UltimatePointer*, 2016 WL 798354, at *5. That is exactly what the district court looked to here. The only evidence that either party presented for the meaning of "defined physical space" came from the specification. A2574-A2575 [JCCS]. Impulse cannot seriously suggest that the district court's use of that specification as guidance constitutes error.

### C. Neither Disclaimer Nor Disavowal Is Required For A District Court To Consult The Specification

Impulse's objection to the district court's claim construction is premised on the notion that the specification should only be consulted if an applicant explicitly defines a term in the specification or expressly disavows the claim's full scope. BB25. But this Court rejected that same argument in *Symantec*, explaining that "[o]ur case law does not require explicit redefinition or disavowal" for the specification to inform claim construction. 811 F.3d at 1363-64 ("Indeed, our en banc *Phillips* opinion rejected this very approach."); *see also UltimatePointer*, 2016 WL 798354, at *5 (rejecting patentee's argument that a court may only deviate from the ordinary meaning when there is an explicit definition or disclaimer).

In any event, cases discussing the standard for disclaimer and disavowal of scope, *see* BB29, have no application here. This is not a case like *Hill-Rom* where there was extrinsic evidence attesting to the plain and ordinary meaning of the claim term outside the patent. *See Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1374 (Fed. Cir. 2014). Similarly, in *Thorner v. Sony Computer Entertainment America LLC*, 669 F.3d 1362, 1367 (Fed. Cir. 2012), the appellant had argued to the district that the term had a plain and ordinary meaning, and therefore did not require any construction.

Here, Impulse never argued that the term "defined physical space" had a plain and ordinary meaning, let alone one that should determine its construction. Instead, Impulse relied only on the specification for the construction it proposed. A2574-A2575 [JCCS]; A2611 [Impulse CC Br.]. Even now, while Impulse pays lip service to the notion of plain and ordinary meaning, it never actually says what that meaning might be. This is not surprising. If the term were to have a meaning that is so clear as to require no interpretation at all, surely that meaning would involve a physical space and not a software construct, and thus be of no help to Impulse.

Ultimately, *Phillips* and its progeny do not impose any precondition for consulting the specification during claim construction. A district court must consider the specification as part of the analysis. That is particularly true where, as here, the claim language does not resolve the disputed question of claim scope without reference to the specification. As Impulse admits, "the claim language 'a tracking system for continuously tracking an overall physical location of a player in a defined physical space' suggests that the 'physical space' must be 'defined' by the time the 'system' performs the function of 'continuously tracking.'" BB27. But even Impulse does not contend that claim language settles the claim scope dispute—only that it does ***not*** settle it conclusively the other way. *Id.* ("This straightforward understanding of the claim language in no way precludes a system where the system's sensor itself defines the physical space."). Impulse's own admissions confirm that the district court's use of the specification as guidance was not only correct, but essential.

### D. The District Court Correctly Construed "Defined Physical Space" To Require A Space That Is Defined And Physical

Consistent with the above precedents, the district court gave the term "defined physical space" a meaning that stays true to the claims and aligns with the description of the invention.

As the district court recognized, the claims explicitly require a space that is ***defined*** and ***physical***. Claim 1 of the '565 Patent reads:[7]

> A testing and training system comprising:
>
> ***a tracking system for tracking an overall physical location of a player in a defined physical space; and***
>
> and a computer operatively coupled to the tracking system for ***updating in real time a player virtual location in a virtual space corresponding to the physical location of the player in the physical space***, for updating a view of the virtual space, and for providing at least one indicium of performance of the player moving in the physical space, wherein at least one indicium of performance is or is derived from a measure of a movement parameter of the player.

A165-A166 ['565 Patent] at Claim 1.

At the outset, the district court correctly recognized that the term "defined" must be given meaning, and that the specification confirms that a defined physical space is a space having fixed known boundaries. The specification discloses a basketball court, a handball court, and more generically, a 20 by 20 foot court with a 10 foot ceiling clearance. A150 ['565 Patent] at 9:12-16. Other examples include a grass football field or a grass baseball field, and 20 by 20 foot "working field." A150 ['565 Patent] at 9:18-24, 10:55-58.

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[7] Like Impulse, Appellees treat Claim 1 of the '565 Patent as representative for purposes of this appeal.

Fundamentally, this makes sense. The patents describe at great length that the boundaries in the virtual space must correspond to the boundaries in the physical space. For example, the specification discloses that the defined physical space may be the boundaries of a basketball court. As the player moves to the defined boundaries of the physical basketball court, the virtual player reaches the boundaries of the virtual playing field. A155 ['565 Patent] at 20:20-23. The known physical boundaries are what establish the virtual boundaries. This correspondence is not possible if the physical boundaries are not known before gameplay begins.

Consistent with this, defined physical spaces are exclusively described as three-dimensional areas that exist and allow for athletic activities regardless of the state of the tracking system, such as "an indoor facility such as a basketball or handball court where about a 20 foot by 20 foot area with about a 10 foot ceiling clearance can be can be dedicated for the training or testing." A150 ['565 Patent] at 9:12-16. Impulse originally cited the specification's teaching that the defined physical space "may be any available area indoors or outdoors of sufficient size to allow the player to undertake the movements for assessing and quantifying distance and time measurements relevant to the player's conditioning, sport, and ability." *Id.* at 9:10-12. Accordingly, it originally proposed a construction that required an available indoor or outdoor area in which a player could move—specifically, "any available area indoors or outdoors of sufficient size to allow player movements." A2574-A2575 [JCCS]. As that proposal shows, the specification teaches that the physical space must be an actual indoor or outdoor area that exists in the physical world.

Although the specification at 9:10-12 suggests that the defined physical space might be any indoor or outdoor space of "sufficient size," the patent specification makes clear that the definition of the physical space is known before game play starts—it does not emerge only after the player begins playing. As the district court explained, the specification does teach that the training system might be portable and thus adaptable to the defined physical space. A71 [RRCC]. "In as much as the system is portable, the system may be transported to multiple sites for specific purposes," and "[f]or relevant testing of sports skills on outdoor surfaces . . . may be transported to the actual playing field for use." A150 ['565 Patent] at 9:16-17, 9:19-24. The fact that the system is described as portable and adaptable to various defined physical spaces confirms that those spaces must exist prior to and independent of the tracking system. A71 [RRCC].[8] There is simply no disclosure of a system that adapts only after gameplay starts.

Thus, Impulse's interpretation threatens the consistency between the patents' claims and written description: the claims would not require a defined physical space that exists before the tracking system is adapted, but the specification only describes a tracking system that is portable and adaptable to pre-existing physical spaces of fixed dimensions.

Indeed, nowhere does the specification contemplate, let alone describe or enable, a physical space defined in relation to the sensor rather than the physical world associated with the player. Nor can Impulse cite to any disclosure of such a system or concept. BB27-39; A72 [RRCC] ("The Court can find no indication in the patents that the sensor viewing area generated by that system can constitute a 'defined physical space.' Indeed, for its part, Plaintiff does not point the Court to any portions of the specification that support such a conclusion; . . . ."). In fact,

[8] On appeal, Impulse criticizes the district court's construction for importing a "temporal" limitation into the claims. BB18-19. Not so. The district court used the term "prior to" to give meaning to the requirement that the space is defined and known independent of the sensor (i.e., it is known and defined before the sensor is set up and thus does not depend on the location, direction, or set up of the sensor). A71 [RRCC] ("Moreover, in describing 'typical' physical spaces, the patent uniformly lists spaces with boundaries known in advance of the adaptation of the system to that space, such as . . . ."). A "defined physical space" is known and defined by its physical existence. It is not relative, and thus not temporal.

while Impulse argues that the specification does not expressly limit itself, it is notably silent as to any evidence that would provide an adequate description or enabling disclosure for the sort of sweeping claim scope it promotes.[9] In other words, Impulse urges the Court to ignore the specification so that it can capture claim scope far removed from what its inventor invented, described, enabled, or claimed.

What the specification does describe and claim is precisely what the district court found. The "Summary of the Invention" describes the purpose of the "[t]he present invention" as "quantifying physical motion of a player or subject and providing feed back to facilitate training and athletic performance." A147 ['565 Patent] at 4:30-33. Athletic training requires spaces in the physical world where such are activities possible, like the defined physical spaces described in the specification and cited by the district court. Similarly, in distinguishing the prior

[9] Describing and enabling the sort of relative system that Impulse now attempts to capture is no simple task. In the patented system, the "defined physical space" is known so that the sensor can be set up to track movement in that space. If the system were to track movement in relative space, one would have to develop a sensor that could detect a physical space such as a football field or a 20x20 training space, conform the sensor viewing area to that space, and then somehow scale that into the claimed virtual space so that movement could be translated to the representation on the display. Whatever Impulse may claim to have invented, it is not that. Indeed, even with the benefit of hundreds of scientists and engineers and years of development by Microsoft's own internal research lab and product teams, the Kinect does not do this.

art, the applicant emphasized that the "Accurate and valid quantification of sport-specific movement capabilities necessitates a simulation having fidelity with real world events." A146 ['565 Patent] at 1:44-61.

If anything, the specification explicitly refers to the viewing range of the sensor using different language from that of the claim term at issue. Figure 1, for example, depicts sensors 14 and 16 and defined physical space 12. Physical space 12 is not the viewing area of the sensors 14 and 16; rather, sensors 14 and 16 are set back far enough from the physical space 12 to see the entire playing field. A150 ['565 Patent] at 9:29-34 ("Such a system uses a pair of optical sensors, i.e., trackers, mounted about 30 inches apart on a support mast centered laterally with respect to the defined physical space 12 at a distance sufficiently outside the front boundary 40 to allow the sensors 14, 16 to track movement in the desired physical space.").[10]

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[10] Impulse's primary response to this evidence is that it relates to an optional embodiment. BB34-35. But Impulse did not identify at the district court, and does not identify here, any evidence that the patent contemplates—let alone describes or enables—a system in which the claimed "defined physical space" is a subset of or dependent on the sensor viewing area. To the contrary, the evidence consistently confirms that the system is designed to allow the user's movements to be tracked when they are moving in the defined physical space. As the patent makes clear, the real-world, physical space in which the user is to move is defined, and the sensor is positioned so that it can actually track movement in that space.

Likewise, the specification explicitly identifies the "three dimensionally defined physical space 12 in which the player moves" as a distinct element from the "wireless position tracking system 13 which includes a pair of laterally spaced wireless optical sensors 14, 16 coupled to a processor 18." A149 ['565 Patent] at 8:26-29. This is shown in Figure 1, which depicts a defined physical space and an independent sensor or tracking system positioned to track movement in that space:

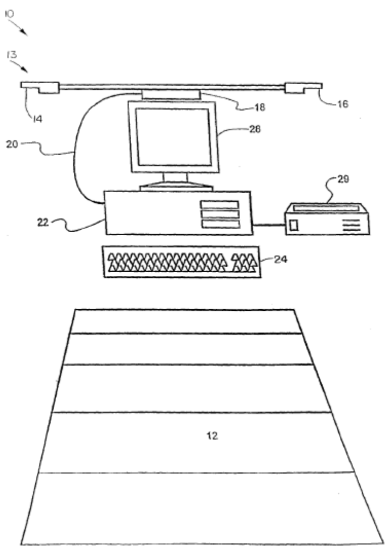

FIG. 1

A120 ['565 Patent] at Fig. 1. Consistent with this, the specification teaches that the "system 10 assesses and quantifies agility and movement skills by continuously tracking the player in the defined physical space 12 through continuous measurement of Cartesian coordinate positions" such that "a movement related to actual distance and time required by a player 36 (also known as an athlete or subject) to travel in the physical space 12 can be quantified." A149-A150 ['565 Patent] at 8:63-9:5.

As a result, as shown in Figure 2, the player's actual movements in the defined physical space can be correlated to the movement of their avatar in the virtual space represented on the display:

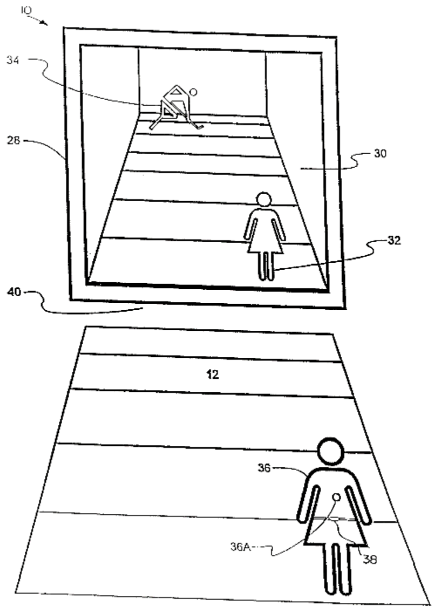

FIG. 2

A121 ['565 Patent] at Fig. 2. These teachings confirm that the physical space is separate from the tracking system and independently exists in the player's three-dimensional world.

Consistent with this disclosure, when the specification refers to the sensor viewing area, it uses the term "tracking volume," not "defined physical space." A150 ['565 Patent] at 10:29-34. By using distinct terminology for the system's sensor, the applicant distinguished that from the defined physical space where the player moves. The applicant knew how to refer to the sensor's tracking volume, and when it did, used specific and distinct language for that concept.

* * *

At bottom, Impulse seeks to ignore the consistent claim language and specification disclosure so it can capture a non-physical construct that is tied directly to the sensor—something its patents do not describe or claim—and stretch the claims beyond what the applicant purports to have invented. This Court has consistently refused to endorse that approach. *See, e.g.*, *On Demand Mach. Corp. v. Ingram Indus., Inc.*, 442 F.3d 1331, 1340 (Fed. Cir. 2006) ("In *Phillips*, 415 F.3d at 1321, the *en banc* court explained that the role of the specification is to describe and enable the invention. In turn, the claims cannot be of broader scope than the invention that is set forth in the specification."); *Gemalto S.A. v. HTC Corp.*, 754 F.3d 1364, 1369 (Fed. Cir. 2014) (same). It should do so again here.

### E. Impulse's Procedural Complaints Are Inconsistent With The Record And Irrelevant To The Merits Of This Appeal

Impulse's primary procedural argument against the district court's judgment does not rely on the existence of any genuine question of material fact, but on the district court's supposed re-interpretation of its claim construction in its summary judgment order. BB40-41. But the district court did no such thing, as the court's decisions and transcript of the claim construction hearing put beyond dispute. As discussed in Section SOC.IV.A *supra,* during claim construction, the court explicitly framed the question at the heart of Impulse's appeal: "can the physical space be sensor defined?" A2652 [*Markman* Tr.] at 122:18-19, 123:4-7.

Counsel for Appellees argued that the issue was presented to the Court as one of claim construction, and the district court agreed. *See* A2652 [*Markman* Tr.] at 123:11-13; A11-A12 [RRSJ]; A65 [RRCC]. On appeal, Impulse implicitly agrees as well, challenging the district court's construction while alleging error due to the court's application of its own construction at summary judgment. BB25. But the summary judgment order itself undermines the allegation that it imposed a new limitation when it found the claims not infringed. As the district court explained at summary judgment:

> The Court's Report Recommendation on claim construction made clear that the space *itself* must be known prior to the adaptation of the system to *that (now, already known) space*. That conclusion was at least implicit in the actual phrasing of the Court's construction of "defined physical space." But it was certainly explicit in the Court's reasoning leading up to its adoption of the construction.

A17-A18 [RRSJ] (emphasis in original); *see also* A71-A72 [RRCC]. The district court's claim construction therefore conclusively decided the question of whether the space had to be "known and defined *prior* to the adaptation of the system to a particular space." A17 [RRSJ].

Impulse had ample opportunity to object or raise unresolved questions before or after the Report and Recommendation on claim construction and final claim construction order issued, but did not do so. Timeliness aside, the claim construction issue underlying Impulse's appeal from summary judgment is already before the Court and the same analysis applies. The "defined physical space" must be known before the system is adapted to a particular space because the physical space must be part of the physical world—like the player moving and being tracked within it.

To the extent Impulse alleges that the court re-construed the claims at summary judgment, Impulse does not raise any new substantive arguments against that construction that are specific to the summary judgment proceedings. *See* BB40-41. The only evidence Impulse identifies to show a substantive change in claim scope is the district court's use of the word "relational" when rejecting its infringement allegation. *See id*. But the district court was comparing the accused products—specifically, the accused hardcoded values representing sensor-defined coordinates—to the claims as previously construed. The court was explicit that the question of whether a defined physical space could be a "defined relational space"—i.e., one defined in relation to the sensor—was "the issue that the Magistrate Judge resolved by claim construction." A3 [Order Adopting RRSJ]. The court concisely characterized the issue, but in no way imposed a new limitation or change in claim scope.

## II. THE DISTRICT COURT CORRECTLY CONCLUDED THAT THE ACCUSED PRODUCTS DO NOT INFRINGE AS A MATTER OF LAW

### A. The District Court Correctly Determined That There Can Be No Literal Infringement As A Matter Of Law

The district court articulated three independent bases for its judgment of no literal infringement: (1) the accused hardcoded values are "just numbers" and therefore "not an actual *physical space* at all;" (2) "[t]he alleged space is purely abstract, and exists only as a mathematical construct in relation to the location and direction of the sensor—it cannot be characterized as any particular physical space that exists indoors or outdoors;" and (3) "to the extent that those [hardcoded] values can be said to represent an actual, physical space, that space cannot be 'known and defined *prior* to the adaptation of the system to particular space' as required by the Court's clam construction." A15-A17 [RRSJ].

On appeal, Impulse focuses on only the third of these independent grounds. Impulse's brief does nothing to suggest that values contained in source code or values representing sensor-defined coordinates can qualify as actual physical space or a particular physical space that exists indoors or outdoors. In other words, Impulse's arguments do not even challenge the district court's conclusion that the hardcoded values on which Impulse relies for the "defined physical space" limitation are not *physical* at all. The judgment of no literal infringement should be affirmed on these bases alone.

As to the third basis for the district court's judgment, Impulse does not suggest that there was any relevant factual dispute as to how the accused products actually function. BB59-61. Nor could there be—the code is the code.[11] Rather, Impulse contends that the district court should have allowed the jury to make the determination as to whether the claim scope is broad enough to cover the undisputed operation of the products. As described below, that is not an infringement question. It is one of claim construction and was rightly resolved by the court as a matter of law.

#### 1. The District Court Correctly Determined That There Was No Material Factual Dispute That Impulse Had Not Identified Any Physical Space At All

Impulse defines the alleged "defined physical space" as a physical space within which the player plays the game, the boundaries of which are defined by a set of "hardcoded values" that are "burned onto each [game] disc" at the time it is manufactured. BB40. But the district court correctly found—and the undisputed evidence confirms—those "hardcoded values" are just numbers (*e.g.*, 2 or 4.3) contained in the source code for the accused games, and, as Impulse acknowledges,

[11] While Ubisoft and EA disagree with certain aspects of Impulse's characterizations of the facts on appeal, the district court did not need to reach this question, and, accordingly, Impulse's characterizations do not impact the issues on appeal. *Compare, e.g.*, BB45-46 (claiming "hardcoded values" exist in the Ubisoft game) *with* A2844-A2845 [MSJ Reply] (citing evidence that hardcoded values do not exist); *see also* A2854-A2855 [MSJ] (citing evidence that Impulse's expert could not identify hardcoded values in EA code).

burned onto the game discs. Although the numbers themselves (*e.g.*, 2 and 4.3) may be independent of the Kinect's viewing area, the space Impulse alleges they describe is not—it is, *e.g.*, the area between 2 and 4.3 feet *away from the Kinect sensor, measured in the direction in which the sensor is pointing* (its viewing area). It is undisputed that, without knowing where the Kinect is located and in what direction it is pointing, the hardcoded values can only describe an abstract, imaginary space, unconnected to the real world—decidedly not a ***physical*** space within which the player plays the game. *See* A16 [RRSJ]; A792 [Sacerdoti Tr.] at 86:21-87:6.

### 2. The Alleged "Defined Physical Space" Is Not An Indoor Or Outdoor Space

There was no dispute at the district court that the "defined physical space" of the claims must be an "indoor or outdoor space." A114 [RRCC]; A2574 [JCCS]. Yet, it is undisputed that the hardcoded values representing the defined physical space ***are defined relative to the Kinect***. BB40. Impulse's own infringement expert Dr. Sacerdoti admitted that this purported "defined physical space" "is completely independent of the space in which any particular Kinect is set up for a specific game." A792 [Sacerdoti Tr.] at 88:6-10; A794 [Sacerdoti Tr.] at 93:23-94:5. To argue, as Impulse does, that the Kinect must always be located in either an indoor or outdoor space, and thus must always meet this limitation, is circular. A17 [RRSJ]. "The alleged space is purely abstract, and exists only as a mathematical construct in relation to the location and direction of the sensor—it cannot be characterized as any particular physical space that exists indoors or outdoors." A17 [RRSJ]. Thus, the district court's grant of summary judgment should be affirmed on this second, independent basis.

#### 3. The Alleged "Defined Physical Space" Is Not "Known And Defined Prior To Adaption" Of The Accused Products

Under the district court's (correct) claim construction, the "defined physical space" "must be known and defined *prior* to the adaption of the system to a particular space, so that [the sensor] can then be 'centered laterally with respect to the defined physical space' or set up outside of the boundary of the space." A71 [RRCC] (original emphasis). The district court also found that the "defined physical space" is "a space that is known prior to the adaption of the testing and training system ***to that space***." A72 [RRCC]. Thus, the claimed "defined physical space" is "an independent concept from the sensor viewing area." *Id.*[12]

Impulse acknowledges that the purported "defined physical space" is "a physical space ***within which the player plays the game***." A2792 [MSJ Opp'n]. But the area "within which the player plays the games" cannot be known until after the Kinect "is placed in a particular location," which both sides agree is the

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[12] As explained above, the district court specifically addressed and rejected arguments by Impulse that the "defined physical space" could be a subset of, or defined by, the sensor viewing area. *See supra* SOC.IV.A.

"adaption" of the accused system. *See* A2793, A2797, A2781 [MSJ Opp'n]; *see* A792 [Sacerdoti Tr.] at 86:21-87:6 (Dr. Sacerdoti admitting that, without knowing both the location and orientation of the Kinect sensor, he could not know where in the physical world the alleged "defined physical space" was). In other words, the accused system operates in the ***opposite*** way from the patented system. In the patented system, the physical space in which the person moves is defined independent of the sensor so that the sensor can be set up to track movement in that space. It is undisputed that in the accused system, there is no defined space independent of the sensor; the sensor tracks movement within its field of view completely irrespective of the physical space in which it is set up.

On summary judgment, the district court correctly found there was simply no factual dispute that the alleged "defined physical space" does not meet the requirements of the claim construction. Impulse's own expert Dr. Sacerdoti admitted that the purported "defined physical space" "is a subset of the Kinect's field of view" and is "dependent on the sensor viewing area of the Kinect." A790 [Sacerdoti Tr.] at 78:22-79:18. Impulse did not dispute, and in fact embraced, its own expert's findings: "Dr. Sacerdoti merely states that the hardcoded values ***are a subset of the Kinect's FOV*** (but not the Kinect FOV itself) and the values ***are specified relative to the Kinect's coordinate system***." A2794-A2795 [MSJ Opp'n]. In other words, the accused products are not "adapted" to any physical space, in part because the alleged "defined physical space" is defined ***with respect to*** the sensor itself. This is a third, independent basis on which the district court's judgment should be affirmed.

* * *

Ultimately, Impulse's showing on appeal is largely irrelevant, focusing on the fact that hardcoded values programmed into Kinect games might define space in some abstract sense without even alleging that they ever occupy physical space within which a player could move. BB42-50. Nor does Impulse contend that those alleged hardcoded values specify the particular space in which the player moves. BB49. In fact, Impulse admits the location of that particular space in the real world—i.e., the defined physical space in which the player's movement is tracked—remains unknown until after the Kinect sensor is adapted for the particular place where it will be used. *Id.* At the same time, Impulse emphasizes that the accused hardcoded values are known in advance and remain the same no matter where the Kinect sensor is placed. BB58. But Impulse misses the implications of those arguments taken together: if the hardcoded values are known, but the defined physical space is not, the values cannot be the defined physical space.

### B. The District Court Correctly Rejected Impulse's Doctrine Of Equivalents Theory On Two Independent Grounds

#### 1. Impulse's Doctrine of Equivalents Showing Was Inadequate

The district court correctly rejected Impulse's doctrine of equivalents showing for failure to meet the threshold legal standard. A18-A22 [RRSJ]; A4-A5 [Order Adopting RRSJ]. The law required Impulse to come forward with "'particularized testimony and linking argument to show the equivalents' are insubstantially different." *Gemalto*, 754 F.3d at 1374 (quoting *AquaTex Indus., Inc. v. Techniche Sols*., 479 F.3d 1320, 1329 (Fed. Cir. 2007)); *Texas Instruments, Inc. v. Cypress Semiconductor Corp*., 90 F.3d 1558, 1566 (Fed. Cir. 1996). Yet Impulse provided only the "skeletal framework" of its argument "in merely a single short paragraph of its answering brief." A18 [RRSJ]. The district court found that showing inadequate, as should this Court.

Fundamentally, Impulse cites expert testimony that bears on the wrong question of equivalence. Impulse's expert does not even contend that the relevant claim element—the defined physical space—functions in substantially the same way whether it is three-dimensional space in the real world or valued encoded in software and defined relative to the system's own hardware. Instead, Impulse relies on its expert's assertion that the difference "does not change the function at all," and that the "difference is insubstantial in terms of "how one skilled in the art could program the environment" of the accused products and the claimed invention." BB59-60. But the difference in terms of how one of skill in the art could program the environment of the accused products says nothing about the difference between a defined physical space and a software construct determined in relation to the system sensor. On that question, Impulse has yet to provide any testimony or argument at all. *Id.*

Even if Impulse's expert opinion were not irrelevant, it would be insufficient. As this Court explained in *Gemalto*, "'[g]eneralized testimony as to the overall similarity between the claims and the accused infringer's product or process will not suffice.' These requirements 'assure that the fact-finder does not, under the guise of applying the doctrine of equivalents, erase a plethora of meaningful structural and functional limitations of the claim on which the public is entitled to rely in avoiding infringement.'" 754 F.3d at 1374 (quoting *Texas Instruments*, 90 F.3d at 1566 and *Pennwalt Corp. v. Durand–Wayland, Inc.*, 833 F.2d 931, 935 (Fed. Cir. 1987) (*en banc*)).

Impulse's principal brief relies on the same type of general and conclusory testimony—specifically, Dr. Sacerdoti's opinion that "[a] defined physical space that is defined in reference to a sensor position (such as the spaces I have identified in the Accused Video Games) performs the same function, in a substantially similar way, to achieve the same result as a physical space that is defined without relation to the sensor position.'" BB59 (quoting A2510 ¶ 11); *see also* BB60 n.14

("In any event, Dr. Sacerdoti answered precisely the proper question: he opined that '[a] defined physical space that is defined in reference to a sensor position (such as the spaces I have identified in the Accused Video Games) performs the same function, in a substantially similar way, to achieve the same result as a physical space that is defined without relation to the sensor position.'"). Those statements add nothing to the legal test other than words of the claims and the phrase, "Accused Video Games." Nor do they cite any record evidence that could raise a factual question, let alone substantiate the expert's conclusion.

This Court has previously affirmed summary judgment of no infringement when a plaintiff "present[s] the district court with only conclusory statements regarding equivalence, without any particularized evidence and linking argument as to the 'insubstantiality of the differences' between the claimed invention and the accused device, or with respect to the 'function, way, result' test." *PC Connector Sols. LLC v. SmartDisk Corp.*, 406 F.3d 1359, 1364 (Fed. Cir. 2005); *see also Akzo Nobel Coatings, Inc. v. Dow Chem. Co.*, 811 F.3d 1334, 1343 (Fed. Cir. 2016) (affirming summary judgment where expert's discussion of equivalence was "broad and scant") (citing *Telemac Cellular Corp. v. Topp Telecom, Inc.*, 247 F.3d 1316, 1329 (Fed. Cir. 2001)). Similarly, in *Gemalto*, this Court affirmed summary judgment where the patent holder provided conclusory expert testimony on the wrong question of equivalents, just as Impulse has here. 754 F.3d at 1374 (finding no substantial difference where the expert addressed the difference between the amount of a software program's code stored on a particular chip instead of the relevant difference between the type of memory required by the claims and type accused of infringement).[13] Impulse should be foreclosed from invoking the substantive application of the doctrine of equivalents to preclude summary judgment on a claim it has failed to support. *PC Connector*, 406 F.3d at 1364. Without more, an expert's *ipse dixit* cannot raise a genuine question of material fact. *See Akzo*, 811 F.2d at 1343 ("[A]mbiguity and generality cannot create a genuine issue of material fact.").

Impulse attempts to undermine the district court's conclusion that its expert's testimony was insufficient by arguing that the order adopting the Magistrate Judge's Report and Recommendation explicitly analyzed infringement under the doctrine of equivalents but did not explicitly discuss the sufficiency of the expert's testimony. *See* BB60 n.14. Not so. The district court explicitly stated, "Plaintiff has offered no argument or expert testimony comparing an abstract set of coordinates to this real-world physical space," and determined that "[s]ummary judgment is warranted on that basis alone" under this Court's precedents. A20 [Order Adopting RRSJ] (citing *Network Commerce, Inc. v. Microsoft Corp.*, 422 F.3d 1353, 1363 (Fed. Cir. 2005) (holding that a "generalized" expert opinion lacking a limitation-by-limitation analysis was insufficient to create a genuine issue of material fact regarding the doctrine of equivalents)).

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[13] For the same reasons, Impulse's assertion that "[n]othing more is needed," BB60 n.4, flies in the face of this Court's decisions establishing that conclusory expert opinions are not enough to preclude summary judgment, particularly where, as here, those opinions have no evidentiary support. *See, e.g., Applied Med. Res. Corp. v. U.S. Surgical Corp.*, 448 F.3d 1324, 1331 (Fed. Cir. 2006) (affirming summary judgment where plaintiff provided "only conclusory and unsupported opinions . . . devoid of meaningful analysis regarding how one of skill in the art would conclude that the differences . . . are insubstantial."); *Phillips Petroleum Co. v. Huntsman Polymers Corp.*, 157 F.3d 866, 876 (Fed. Cir. 1998) (expert declarations failed to raise a genuine issue of fact precluding summary judgment because they were "'wholly conclusory, devoid of facts upon which the affiant[s'] conclusions, as experts, were reached'") (alteration in original). Impulse cannot avoid summary judgment by having its expert recite the words "substantially the same way" without giving those words concrete meaning.

Regardless, the district court explicitly adopted the Magistrate Judge's Report and Recommendation without qualification. In doing so, it rightly rejected Impulse's contention that its expert's testimony was somehow improperly dismissed. A2870 [Impulse's Obj. to RRSJ]. In any event, the fact that Impulse on appeal does not point to anything in the record other than Dr. Sacerdoti's conclusory assertions, *see* BB59, confirms that there would be no basis on which a reasonable jury could find the difference between a software construct and physical space insubstantial.

### 2. In Any Event, Claim Vitiation Confirms That The Accused Products Are Beyond The Scope Of The Claimed Invention

Principles of claim vitiation confirm that Impulse cannot stretch its claims to cover the accused Kinect system and video games on the grounds that they are equivalent to the claimed "defined physical space." Impulse argues that regardless of how that space is defined, "there is still a defined physical space. No claim limitation is vitiated." BB61. But that argument assumes the word "physical" imposes no limitation on claim scope because a space, however defined, may qualify under Impulse's interpretation. To wit, under Impulse's theory, numerical values defining points in relation to the Kinect sensor can be equivalent because they ***define*** points that may overlap with the physical space. Of course, that assumes that the space does not need to be ***physical*** itself. Put another way, it reads the term "physical" out of the claim by treating "defined physical space" as equivalent to "defined non-physical space."

Even Impulse admits that its infringement theory disregards the "physical" limitation because "[a]s long as [the space] is *defined*, so that the position and movements can be related to position and movements in a virtual computer world, the game simply does not care." BB61. The doctrine of equivalents does not allow patentees to circumvent express claim limitations, as Impulse does here. An infringement theory that reads out an express limitation "improperly vitiates claim language by allowing the exact opposite of what is required." *Mirror Worlds, LLC* *v. Apple Inc.*, 692 F.3d 1351, 1358 (Fed. Cir. 2012). Here, Impulse's theory requires reading the claims to cover the exact opposite of what they require—physical space—by accusing software containing information that is not physical space in which a player could move.

The district court's consideration of claim vitiation to preclude Impulse's theory was consistent with this Court's precedent as well as that of the Supreme Court. *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 39 n.8, 117 S. Ct. 1040 (1997). *Warner-Jenkinson* expressly warns against the application of the doctrine in ways that "conflict[] with the definitional and public-notice functions of the statutory claiming requirement," and as a "means of avoiding this conflict," held that "the doctrine of equivalents must be applied to individual elements of the claim, not to the invention as whole." *Id.* at 29. It went further, noting that "[i]t is important to ensure that the application of the doctrine, even as to an individual element, is not allowed such broad play as to effectively eliminate that element in its entirety," to ensure "that the doctrine will not vitiate the central functions of the patent claims themselves." *Id.* at 29-30.[14]

The principles of claim vitiation preclude arguments like the one Impulse raises here because it focuses on how the claimed space is defined, instead of what the claimed space actually is. BB61. Critically, the function of the claimed space is not to ***define*** space, but to ***be*** space in which a player's movement can be tracked by the system. Impulse's theory turns the claim on its head by eliminating the required element—a defined physical space in which a player is moving—and substituting it for a definition of space that has no physical form. Impulse implicitly admits it is asking the court to read the word "physical" out of the claim because, "when viewed from the perspective of the system, *all* space is 'relational,'" *id.*, regardless of whether it is physical. But Impulse does not suggest, let alone prove, that there is no substantial difference between a defined physical space, on the one hand, and a space defined in the abstract but lacking any physical form or relation to the physical world that would allow the system to track the player's movement according to the claims, on the other.

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[14] Some recent opinions have suggested claim vitiation is another name for the conclusion of no equivalence rather than a principle guiding the analysis. *See Cadence Pharm. Inc. v. Exela PharmSci Inc.*, 780 F.3d 1364, 1371 (Fed. Cir. 2015) ("'Vitiation' is not an exception or threshold determination that forecloses resort to the doctrine of equivalents, but is instead a legal conclusion of a lack of equivalence based on the evidence presented and the theory of equivalence asserted."); *Ring & Pinion Serv. Inc. v. ARB Corp.*, 743 F.3d 831, 836 (Fed. Cir. 2014).

Others have confirmed that the principle of vitiation follows from Supreme Court precedent. "The Supreme Court has stated, 'if a theory of equivalence would entirely vitiate a particular claim element, partial or complete judgment should be rendered by the court[,]' . . . . Under the doctrine of equivalents, an infringement theory thus fails if it renders a claim limitation inconsequential or ineffective." *Akzo*, 811 F.3d at 1342 (quoting *Warner-Jenkinson*, 520 U.S. at 29, 39 n.8 (1997)); *see also Lockheed Martin Corp. v. Space Sys./Loral, Inc.*, 324 F.3d 1308, 1321 (Fed. Cir. 2003) ("Thus, if a court determines that a finding of infringement under the doctrine of equivalents 'would entirely vitiate a particular claim[ed] element,' then the court should rule that there is no infringement under the doctrine of equivalents"); *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1279 (Fed. Cir. 2001).

The Supreme Court has not altered its holding in *Warner-Jenkinson*, nor has this Court altered its precedent precluding equivalence that vitiates claim elements. This Court's recent decisions questioning the force of vitiation must give way to those earlier decisions as binding on this Court. *See Newell Cos., Inc. v. Kenney Mfg. Co.*, 864 F.2d 757, 765 (Fed. Cir. 1988).

In any event, whether it is a formal exception to the doctrine of equivalents or a legal conclusion, the district court correctly determined that Impulse's theory is fundamentally inconsistent with language of the claim such that no reasonable jury could find equivalence.

## III. IMPULSE'S APPEAL AS TO KONAMI IS BASELESS

Finally, as noted in Section SOC.IV.B *supra*, Impulse narrowed its case against Konami throughout the district court proceedings, culminating in a stipulation for judgment of non-infringement entered soon after claim construction, resolving the sole remaining patent claim (Claim 22 of the '121 Patent) as to Konami. On appeal, Impulse has not raised any argument concerning the '121 Patent, or argued that any other patent or claim previously asserted by Impulse but abandoned vis-à-vis Konami could be revived. If, *arguendo,* Impulse had an argument for challenging the judgment in Konami's favor, Impulse has waived any such argument by failing to raise it in the opening brief. *SmithKline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1319 (Fed. Cir. 2006).[15] For this independent reason, the judgment in Konami's favor should be affirmed and Konami should be awarded its costs on appeal.

## IV. CONCLUSION

For the foregoing reasons, the district court's claim construction and summary judgment of non-infringement should be affirmed.

Dated: April 18, 2016

Respectfully submitted,

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[15] Multiple limitations in the '121 Patent are not met by Konami's accused games, requiring Impulse to stipulate to judgment of non-infringement as to Konami for reasons unrelated to the court's construction of "defined physical space." A3155-A3156 [ Konami Stip.].

Dated: April 18, 2016

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## CERTIFICATE OF SERVICE

I hereby certify that, on this 18th day of April 2016, I electronically filed the foregoing with the Clerk of the Court using the CM/ECF system, and thereby served, via email, a true and correct copy of the same to the following:

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1. This brief complies with the type-volume limitation of Federal Rule of Appellate Procedure 32(a)(7)(B) or Federal Rule of Appellate Procedure 28.1(e). The brief contains 13,985 words, excluding the parts of the brief exempted by Federal Rule of Appellate Procedure 32(a)(7)(B)(iii).

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Dated: April 18, 2016

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